

Claims

1. Apparatus for filling containers with liquid of the type having a tubular filling lance operatively connected to a source of liquid and being vertically moveable between raised positions above said containers and lowered positions, when coaxially aligned with a filling hole in one of said containers, extending through said filling hole into said container for filling thereof, said apparatus comprising:

a conveyor assembly on which two or more of said containers may be moved to a filling station generally below said filling lance, the filling holes of said containers being randomly disposed;

a gantry frame located at said filling station and under which said containers may be moved by said conveyor assembly to said filling station;

a carriage assembly supported on said gantry frame and by which said filling lance may be moved in X, Y,Z coordinates; where the X axis is horizontal and transverse to movement of said conveyor means, the Y axis is horizontal and perpendicular to said X axis and the Z axis is vertical; first to a raised position coaxially aligned with a selected one of said container filling holes and then to a lowered position into said selected container;

an electronic sensor positioned above said gantry frame for sensing, in X and Y coordinates, the location of each of said container filling holes; and

a controller connected to said electronic sensor and to said carriage assembly for activation of said carriage assembly for movement of said filling lance to said coaxial alignment with said selected one of said container filling holes and then to said lowered position into said selected container for filling thereof..

2. Container filling apparatus as set forth in Claim 1 in which said gantry frame comprises support members on which said carriage assembly is supported for horizontal movement relative to said X and Y axes.

3. Container filling apparatus as set forth in Claim 2 including a first pair of spaced apart rails supported by said gantry frame and a second pair of spaced apart rails supported on said first pair of rails for movement by a corresponding power device in directions perpendicular to said Y axis.

4. Container filling apparatus as set forth in Claim 3 in which said carriage assembly comprises a mast carriage upwardly from which extends a vertical mast which supports a lance carriage to which said filling lance is attached and by which said filling lance may be moved by a corresponding power device between said raised and lowered positions.

5. Container filling apparatus as set forth in Claim 1 in which said carriage assembly comprises a mast carriage and a lance carriage, said mast carriage supporting a vertical mast and being operably connected to one or more power devices for positioning of said mast in X, Y coordinates in response to signals from said controller, said filling lance being carried by said lance carriage which is supported on said vertical mast and which is operably connected to a power device for movement of said filling lance between said raised and lowered positions in response to signals from said controller.

6. Container filling apparatus as set forth in Claim 5 in which said carriage assembly comprises a first pair of spaced apart horizontal rails on which a second pair of spaced apart horizontal rails are supported for transverse movement relative to movement of said containers by said conveyor assembly, said mast carriage being mounted on said

5 second pair of rails for parallel movement relative to movement of said containers by said conveyor assembly.

7. Apparatus for filling containers with liquid of the type having a tubular filling lance operatively connected to a source of liquid and which is vertically moveable between raised positions above said container and lowered positions when coaxially aligned with a filling hole of a selected one of said containers, so as to extend through
5 said filling hole and into said container for filling thereof with liquid, said apparatus comprising:

a conveyor assembly on which two or more containers, having upwardly opening filling holes therein, may be placed and moved to a filling station generally below said filling lance, said filling holes being randomly located;

10 a gantry frame located at said filling station having vertical support members supporting at least a pair of spaced apart horizontal support members beneath which said containers may be moved by said conveyor assembly to said filling station and on which are provided a first pair of spaced apart rail members and a second pair of spaced apart rail members, perpendicular to said first pair of rail members, the ends of
15 which are supported on said first pair of rail members for movement by a corresponding power device in direction perpendicular to movement of said conveyor assembly;

a mast carriage, upwardly from which extends a vertical mast, supported on said second pair of rail members for movement by a corresponding power device in directions parallel to movement of said conveyor assembly;

20 a lance carriage to which said filling lance is attached, supported on said mast for vertical movement by a corresponding power device for effecting movement of said filling lance between said raised and lowered positions;

an electronic scanner positioned above said filing station for sensing in X, Y coordinates, the location of said container filling holes when said containers are located at
25 said filing station; and

a controller connected to said electronic scanner and each of said power devices for activating said power devices to move said mast carriage until said filing lance is coaxially aligned with a selected one of said container filling holes and subsequently to move said filling lance from a raised position to a lowered position
30 through said selected filling hole and into its container for filling with liquid.

8. Container filling apparatus as set forth in Claim 7 in which said corresponding power device of said rail member and said mast carriage comprises rotating shafts connected by power transmission mechanisms to said second pair of rail members and said mast carriage for effecting said movement thereof.

9. Container filling apparatus as set forth in Claim 7 in which said conveyor assembly and said gantry frame are designed to accept a pallet on which four of said containers are carried with randomly disposed filling holes for movement to said filling station, said filling lance being moveable on said mast carriage to coaxial positions
5 aligned with any one of said randomly disposed holes.

10. A method of filling containers with liquid utilizing apparatus which includes a filling lance operatively connected to a source of liquid and vertically moveable between raised positions above said containers and lowered positions

extending through filling holes in said containers for filling thereof, said method

5 comprising:

conveying two or more containers to said filling station, the filling holes
of which are randomly disposed;

sensing the location of each filling hole of each of said containers;

transmitting the location of each of said filling holes to a controller which
10 is connected to power assemblies capable of positioning said filling lance, horizontally in
X, Y coordinates; where the X axis is horizontal and transverse the direction of
conveying said containers to said filling station and where the Y axis is horizontal and
perpendicular to said X axis; and along a Z axis which is vertical;

moving said filling lance in response to said controller and said power
15 assemblies to a position directly above a selected one of said filling holes; and

lowering said filling lance in response to said controller and power
assemblies through a selected one of said filling holes into its corresponding container for
filling with liquid.

11. The method of Claim 10 in which said power assemblies comprise
horizontally moveable carriages on which said filling lance is supported for positioning in
X and Y coordinates and a vertically moveable carriage on which said filling lance is
supported for said Z axis vertical movement between said raised and lowered positions.